In re Patent Application of:
CHARLES CARPENTER
Serial No. **09/864,918**
Filing Date: **May 24, 2001**
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If further prosecution of this application can be facilitated through a telephone conference between the Examiner and the undersigned, the Examiner is requested to telephone the undersigned at the Examiner's convenience.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: ASSISTANT COMMISSIONER FOR PATENTS, WASHINGTON, D.C. 20231, on this 10TH day of July, 2002.

Edward Bradley

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Please replace the paragraph beginning on page three (3), line nine (9) of the specification with the following rewritten paragraph:

The present invention is directed to a system and method permitting array processing of surface acoustic wave devices and other microelectronic components. The preferred method of the present invention comprises the steps of (a) forming a unitary array of a nonconductive material having opposing first and second surfaces and plural spaced cavities extending into the array from the first surface, each cavity dimensioned to receive a SAW [device] die therein; (b) forming a recess at each cavity adjacent the first surface, each recess having a width greater than the corresponding cavity and dimensioned to receive a lid within the recess; (c) providing at least two conductive paths from the interior of each cavity to a surface of the array; (d) inserting a SAW [device] die into each of a plurality of the cavities, each SAW [device] die having conductive means electrically contacting the conductive paths within the interior of the corresponding cavity after insertion; (e) sealing a lid in the recess over each inserted SAW [device] die; and then (f) separating the array into individual SAW devices along separation lines between adjacent cavities.

Please replace the paragraph beginning on page three (3), line twentysix (26) of the specification with the following rewritten paragraph:

The present invention also comprises surface acoustic wave devices manufactured according to the methods described above. Those devices are formed from an assembly comprising the unitary array with cavities and recesses as described above, and with a SAW [device] die inserted into each one of a plurality of the cavities in electrical contact with conductive paths extending from the interior of the corresponding cavity to a surface of the array. After the sealing of a lid in each respective recess over the inserted SAW [device] die, the array is separated into individual SAW devices.

Please replace the paragraph beginning on page four (4), line thirty (30) of the specification with the following rewritten paragraph:

FIG. 2 is a perspective illustration of a typical ball bonding of flip chip surface acoustic wave (SAW) [device] die.

Please replace the paragraph beginning on page six (6), line four (4) of the specification with the following rewritten paragraph:

Reference is now made to FIG. 2, which illustrates a typical surface acoustic wave (SAW) [device] die **40** formed in a piezoelectric body **42** having an upper surface **44** onto which are deposited a first set of interdigitated electrodes **46** with associated bond pad **48** and a second set of interdigitated electrodes **50** with associated bond pad **52**. As shown

in FIG. 3, during processing, the SAW [device] die **40** is oriented in the cavity **18** with the bond pads **48, 52** in respective contact with the conductive layers **22, 24** in a typical "flip-chip" arrangement. It will of course be understood by one skilled in the art from the discussion set out below that the cross-section of FIG. 3 illustrates the assembly after bonding, so as to fix the SAW [device] die **40** in place before the assembly **10** is inverted for separation of individual components and testing.

Please replace the paragraph beginning on page six (6), line fifteen (15) of the specification with the following rewritten paragraph:

Referring again to FIG. 1, after the SAW [device] die **40** is placed in the cavity **18** the lids **60** are then placed over the cavities **18** in the lid alignment recesses **26** and in contact with the overlap area **28**. Preferably, this is achieved using automated equipment.

Please replace the paragraph beginning on page six (6), line twentynine (29) of the specification with the following rewritten paragraph:

After the reflow step discussed above, means are applied to the bottom surface **16** of the ceramic body **12** to maintain the integrity of the array during separation of individual SAW devices along separation lines **70, 72**. In a preferred arrangement, this means comprises a tape **74** applied across the first surface **14** and the top surface **62** of the lids **60**. Preferably, the array is "singulated" (i.e., rendered into individual components) via

dicing [SAW] saw or another suitable separation technique along the separation lines **70, 72**. Thereafter, the tape **74** is removed to permit further handling of the individual SAW devices **100**.

In the Claims:

Please cancel Claims 3-5, 14, and 16-18.

Please amend the following Claims to read as follows:

1. (Amended) A method for manufacturing individual surface acoustic wave (SAW) devices, the method comprising the steps of:

forming a unitary array of a [non-conductive] material having opposing first and second surfaces and plural spaced cavities extending into the array from the first surface, each cavity dimensioned to receive a SAW [device] die therein;

forming a recess at each cavity from the first surface, each recess dimensioned to receive a lid within the recess;

providing at last two conductive paths from the interior of each cavity to a surface of the array;

inserting and attaching a SAW [device] die face down into each of a plurality of the cavities, each SAW [device] die having conductive means electrically contacting the conductive paths within the interior of the corresponding cavity after insertion;

sealing a lid in the recess over each inserted SAW [device] die; and then

separating the array into individual SAW devices along separation lines between adjacent cavities.

6. (Amended) The method recited in Claim [5] 1, wherein the lid sealing step comprises the steps of:

placing a lid over each cavity;

placing a sealing material about the periphery of each lid; and then

treating the package array-lids combination so as to seal each lid with the sealing material.

11. (Amended) The method recited in Claim [5] 1, further comprising the steps of:

placing a continuous tape across the first surface and the sealed lids prior to the separating step;

undertaking the separating step from the second surface while maintaining continuity of the tape across the first surface; and then

removing the individual components from the tape.

12. (Amended) The method recited in Claim [5] 1, further comprising the step of forming the [package] unitary array from a non-conductive material.

13. (Amended) The method recited in Claim 12, wherein the [package] unitary array comprises a ceramic.

15. (Amended) The method recited in Claim [5] 1, wherein the lid sealing step comprises the step of hermetically sealing the cavity from an ambient environment.

19. (Amended) An assembly for manufacturing individual surface acoustic wave (SAW) devices comprising:

a unitary array of a nonconductive material having opposing first and second surfaces and plural spaced cavities extending into the array from the first surface, a plurality of the cavities having a SAW [device] die inserted therein;

a recess at each cavity extending from the first surface, each recess dimensioned to receive a lid within the recess;

means providing at least two electrically conductive paths from the SAW [device] die within each cavity to an outer surface of the array;

a lid sealed in each recess over an inserted SAW [device] die and the corresponding cavity; and

wherein the array may be separated into individual SAW devices along separation lines between adjacent cavities.